

5       **METHOD AND APPARATUS FOR PIEZOELECTRIC LAYER-WISE PUMP AND**  
          **VALVE FOR USE IN LOCAL ADMINISTRATION OF BIOLOGICAL RESPONSE**  
          **MODIFIERS AND THERAPEUTIC AGENTS**

**ABSTRACT**

10       A method and apparatus for local infusion of a variety of biological response modifiers  
(BRMs) and chemotherapeutic agents including tumor necrosis factors (TNF) is described. In  
one embodiment, the device contains a synthetic pouch compartmentalized into three or more  
chambers, and an electronic apparatus controlling and modulating the delivery of the agents to  
15       the site of the tumor, so as to achieve a desired regimen in support of the elimination of a tumor  
burden. In one embodiment, an electronic system provides tailored and controlled regulation of  
the administration of such agents, using sensors to monitor the progress of the treatment. Desired  
dosing and scheduling of anti-tumor agents in a local setting is provided. In one embodiment,  
active control and regulation of the administration of medicating agents is attached to a synthetic  
20       pouch and with the aid of a piezoelectric valve and pump actuating mechanism. The apparatus  
provides the desired dose, duration and timing of dose delivery. In one embodiment, reporting  
the events in the tumor site via an RF link to the external control box is provided.

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